

cation of benzene type. Then, the dependence of the thermodynamic parameters from the number of carbon atoms in the alkyl substituent of the benzene ring was determined for selected type of reactions.

The results of Table 2 show that with increasing

the number of carbon atoms in the alkyl substituent also increases the thermodynamic probability of cracking reactions, due to the weakening of internal communication links in the alkyl substituent.

## Reference

1. Tilicheev M.D. *Chemistry of cracking.* – M.: Book-on-Demand, 2013. – P.269.

## ELECTROCHEMICAL OXIDATION OF NITROPHENOLS

E.V. Sukhoroslova, E.V. Zangieva, A.B. ladykina

Scientific supervisor – PhD, Associate Professor, O.S. Kukurina

Linguistic advisor – PhD, Associate Professor, O.S. Kukurina

National Research Tomsk Polytechnic University

634050, Russia, Tomsk, Lenina Avenue, 30, annaanna.borisovna@mail.ru, kukurina@tpu.ru

Phenol and substituted phenolic compounds, especially nitro-derivatives are extremely toxic and namely nonbiodegradable pollutants. They are discharged in the effluent from the chemical process industries which are either manufacturing or using them. Thus the various techniques of phenolic pollutants destruction are still burning issues nowadays. And chemical oxidation is considered to be the most universal method.

The process of destructive pesticides oxidation is carried out in a laboratory installation, the basic unit of which is the electrochemical cell [1].

To increase the rate of oxidation of toxic organic substances and prevent stagnant zones in the reactor used continuous stirring. The oxidation process is carried out in the kinetic region [2].

The process of oxidative degradation was investigated on nitrophenol. The substance to be subjected to oxidative degradation, dissolved in 80 ml of sulfuric acid and transfer into the apparatus. The concentration of the electrolyte may vary from 10 to 96 wt.%. A voltage is applied to the electrodes

ates and final products by means of UV spectrophotometry, gas chromatography with mass selective detector and high performance liquid chromatography.

During the experiment were obtained following data. This data show the presence of absorption bands at 210 nm – oxygenated compounds; 270 nm – phenol derivatives; 350 nm – nitrophenol.

According to the chromatography data at 0 minute is the largest peak, with the peak decreases over time, this means that the nitrophenol concentration in the solution decreases. Delay time 8.53 minutes carboxylic acids. That is, the oxidation passes through their formation. Phenol delay time – 14, 76 minutes at peak chromatograms of phenol was not detected. As the peak of hydroquinone – 24.85 minutes.

Thus the organic component of molecules is oxidized through intermediate products formation (such as acids, alcohols and aldehydes) up to simple compounds. At the same time some of these groups are destroyed on the cathode by reduction [4].



Fig. 1.

of the adjustable constant current source. During oxidation in reactor temperature can be increased up to the boiling point of the solution, in this case necessary to provide heat removal. At certain time intervals samples were taken for analysis [3].

We carried out the identification of intermedi-

Thus, according to UV-spectroscopy the nitrophenol oxidation intermediates are phenol and carboxylic acids, and gas chromatograph with mass spectroscopy determines the carboxylic acids without phenol.

## References

1. Zangieva E.V., Kukurina O.S. *The study of intermediates of electrochemical liquid phase phenol oxidation. Materials of XV Intern. Sci. Conf. "Chemistry and Chemical Engineering in XXI century" dedicated to prof. L.P. Kulyov. Tomsk. – 26–29 may, 2014.*
2. Olga Kukurina, Zarina Elemensova, Anna Syskina / *Mineralization of organophosphorous pesticides by electro-generated oxidants. Bulletin of the Tomsk Polytechnic University, 2015.*
3. Manfred Hesse, Herbert Meier, Bernd Zeeh / *Spectroscopic Methods in Organic Chemistry. – 2nd edition. : Thieme. – Stuttgart, New York, 2008. – P.453.*
4. <http://bd.patent.su/2278000-2278999/pat/servlet/servlet96e2.html>.